

FAMILY PLACEMENT OF THE AFRICAN GENUS MEGANOMIA
COCKERELL WITH A REVIEW OF THE INCLUDED SPECIES

(HYMENOPTERA: APOIDEA)

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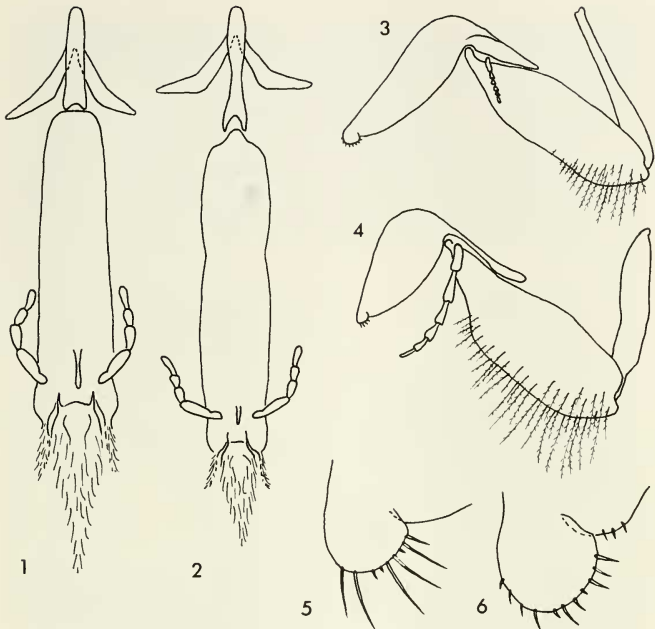
ABSTRACT—*Meganomia* Cockerell is transferred from the subfamily Nomiinae in the Halictidae to the subfamily Melittinae in the Melittidae. The species in the genus are reviewed and a key provided.

Meganomia is a small genus of medium sized bees from several localities in the arid parts of Africa south and east of the tropical regions. No doubt impressed by a habitus suggestive of certain African species of *Nomia*, Cockerell originally described the taxon in 1909 as a monobasic new subgenus of *Nomia* to contain the new species, *N. (M.) binghami*. Since that time there appeared at least ten pertinent publications by seven different authors (Arnold, 1947; Cockerell, 1931, 1933, and 1934; Friese, 1909, and 1930; Hedicke, 1931; Meade-Waldo, 1916; Michener, 1944; and Strand, 1920). In all these publications the authors either treated the bees as species of *Nomia* without knowing of Cockerell's previous work or they more or less followed Cockerell's lead and treated them as species of *Meganomia*. In the latter case *Meganomia* was considered either a subgenus of *Nomia*, or a closely related but distinct genus, or a distinct genus within the halictid subfamily Nomiinae whose affinity with *Nomia* is not specified.

I have recently studied authoritatively identified specimens in the collection of the U.S. National Museum, Smithsonian Institution, Washington, D.C., representing both sexes of the type species as well as the female of a second species. In my opinion these bees are not closely related to *Nomia* and should not even be included in the family Halictidae. Indeed, they belong in the family Melittidae where they fit nicely into the typical subfamily in spite of several bizarre (for melittids) characters and a habitus suggestive of certain nomiines or even more of many anthidiines.

Since the original description of *Meganomia* and those of its included species are inadequate, the following redescription of *Meganomia* is presented to document the necessity of its interfamilial transfer as well as to permit a more adequate understanding of its relationship to other melittine genera. Significant family characters are printed in italics.

The form of the mouthparts (maxillae and labium) alone are sufficient to preclude the possibility of *Meganomia* belonging in any family other than Melittidae or Andrenidae. Since the single subantennal sutures, the lack of facial foveae, the limited scopae, and the form of



Figs. 1, 3, 6, *Meganomia tavetensis* Ckll.: 1, ♀ labium; 3, ♀ maxilla; 6, apex of galea. Figs. 2, 4, 5, *M. binghami* (Ckll.): 2, ♀ labium; 4, ♀ maxilla; 5, apex of galea.

the male genital capsule are all contraindicative of the latter but compatible with the former, *Meganomia* must be a melittid and is hereby transferred to that family.

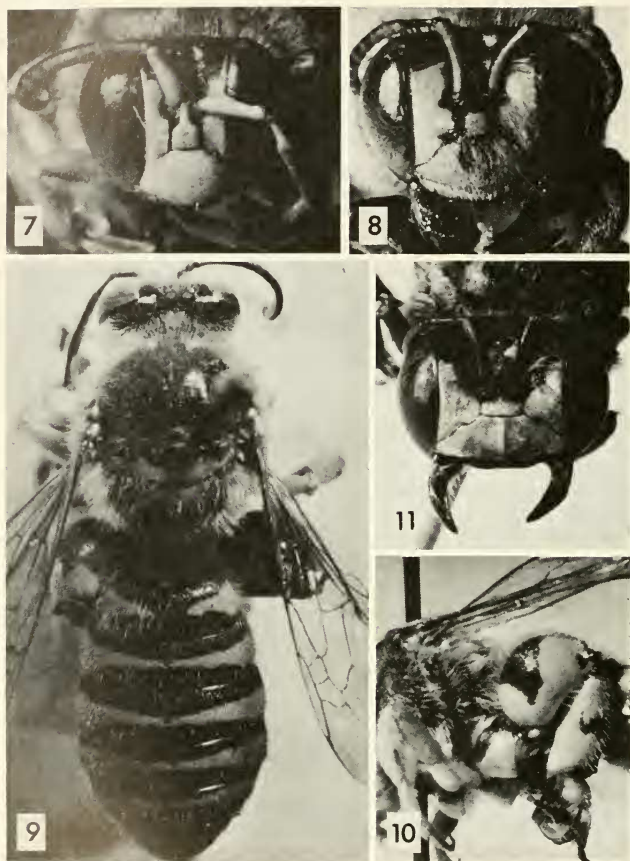
***Meganomia* Cockerell**

(Melittidae: Melittinae, new family and subfamily placement)

(Figs. 1–11)

Nomia (*Meganomia*) Cockerell, 1909, p. 402 (as a monobasic subgenus for *N.* (*M.*) *binghami*); Arnold, 1947, p. 208 (characterized as a subgenus of *Nomia*). *Meganomia* Cockerell, 1931, p. 201 (raised to generic rank); Michener, 1944, p. 251 (cited as a genus in the *Nomiinae*).

Diagnosis: The species of *Meganomia* can be easily distinguished from all other melittid genera by their extensive yellow integumental markings and generally sparse vestiture which gives them a habitus



Figs. 7-10, *Meganomia binghami* (Ckll.): 7, ♂ head; 8, ♀ head; 9, ♂ dorsal view; 10, ♂ mid and hind legs. Fig. 11, *M. tavetensis* Ckll., ♀ head.

suggestive of anthidiines. In addition, the transversely hollowed labrum, the apically modified galea and the conspicuously developed, carinate gradulae are unique among melittids. Likewise, in males the apically hooked antennae, the inflated hind legs and the reduced, linear volsellae are unique among melittids.

Description: Integument contrastingly black and yellow with yellow areas particularly extensive on front of head, on legs, and on metasoma. Vestiture generally sparse and short, particularly on metasoma. *Subantennal sutures directed more toward outer edge of scrobes than inner; subantennal plates absent*; apex of flagellum flattened and forming a hook in male; *facial foveae absent; labrum much broader than long*, medially deeply hollowed transversely to receive closed mandibles; *galeae distinctly longer postpalpally than prepalpally*; galeae with fringed apical lobe formed by deep subapical emargination on outer edge; *stipes lacking comb; glossa acute; labial palpi subequal and subcylindrical; mentum long, parallel sided or tapering basally; submentum large, V-shaped. Pre-episternal suture absent; scrobal suture absent anterior to episternal scrobe*; metanotum subhorizontal. Wings with marginal cell long, narrow and apically narrowly rounded near costal margin, 3 submarginal cells; 1st submarginal cell longest and subequal to 2nd and 3rd combined; 2nd and 3rd submarginals subequal or 2nd slightly shorter; prestigma longer and wider than stigma; jugal lobe $\frac{1}{2}$ to $\frac{2}{3}$ length of vannal lobe. Basitibial plate absent in males, if present in females than plate obscured by velvet-like patch of short, dense, hairs; mid leg with femora longitudinally carinate below in female; *scopa confined to hind tibia and basitarsi* and composed primarily of long, simple hairs; hind leg of male with femora grossly inflated, tibia inflated less, and basitarsi inflated but strongly excavated on inner edge. Metasomal terga 2 to 5 in female and 2 to 6 in male with gradulae well developed, conspicuously carinate and extending to posterior margin of terga; terga 1 to 4 in female and 1 to 7 in male with posterior part shallowly depressed and conspicuously less densely punctate than anterior part; tergum 5 in female with dense subapical fimbria; *pygidial plate present and well developed in both sexes. Male genital capsule with gonobase large; gonostyli not distinguishable from gonocoxites; penis valves unfused except dorsally near base; volsellae present* but small, linear and lacking lateral cusps.

The four species currently assigned to this genus can be separated by the following key.

PROVISIONAL KEY TO THE SPECIES OF *Meganomia*

- 1. Females 2
- Males 4
- 2(1). Lateral ocelli well below top of vertex in frontal view; scape unicolorous, dark 3
- Lateral ocelli nearly tangent to top of vertex in frontal view; scape bicolorous, yellow beneath, dark above **M. binghami**
- 3(2). Clypeus with distinct longitudinal median ridge (fig. 11); terga 2 to 5 with transverse yellow bands broad and entire **M. tavetensis**
- Clypeus lacking median ridge; terga 2 to 5 with transverse yellow bands narrow and interrupted broadly at meson **M. tsavoensis**
- 4(1). Median flagellar segments subcylindrical; hind trochanters pointed posteriorly (fig. 10) **M. binghami**
- Median flagellar segments subtuberculate beneath making flagellum serrate; hind trochanters not pointed **M. andersoni**

***Meganomia binghami* (Cockerell)**

(Figs. 2, 4, 5, 7-10)

Nomia (Meganomia) binghami Cockerell, 1909, pp. 402-403 (Male and female described); Hedicke, 1931, p. 35 (Synonymy of *N. flavofasciata* Friese).

Nomia flavofasciata Friese, 1909, p. 170 (Female described); Friese, 1930, p. 14 (Male described); Hedicke, 1931, p. 35 (Synonymized with *N. (M.) binghami*).

Meganomia binghami: Cockerell, 1931, p. 202; Cockerell, 1933, p. 376 (New locality record).

Female: Length 17.5 mm. Vertex flat in frontal view; compound eyes very large with inner orbits subparallel most of length; summit of eyes reaching top of vertex in frontal view; lateral ocelli nearly tangent to top of vertex; clypeus broadly uniformly convex, and with surface partly obscured by short white oblique hairs; supraclypeal area with median maculation; scape bicolorous, yellow beneath, dark above; mandibles with subapical inner tooth; maxillary palpi exceeding post-palpal portion of galea in length; longest seta on apical lobe of galea subequal to width of that lobe; labial palpi with first segment subcylindrical. Notauli and parapsidal lines well developed and long, with the latter extending from hind margin of mesoscutum anteriorly to tegulae; marginal cell not apically appendiculate; 2nd and 3rd submarginal cells subequal along posterior side and sides of 2nd submarginal strongly converging anteriorly; hind femora longitudinally carinate below; basitibial plate discernible under velvet-like patch of short, dense pubescences; scopa dense, composed of long, silvery hairs; hind tibial spurs obscured by long hairs. Metasomal tergum 1 with lateral arms of gradulus present, median transverse section absent; terga 4 and 5 with a small, oval, uniformly fine aciculate spot mesad of each spiracle and anterior to gradulus (may be hidden under margin of preceding tergum); sterna with vestiture short, sparse, and pale.

Male: Length 18.0 mm. Vertex flat in frontal view; compound eyes extremely large with maximum width seen from in front subequal to interorbital distance and with inner orbits convex and diverging at both ends; summit of eyes reaching top of vertex in frontal view; lateral ocelli tangent to top of vertex in frontal view; clypeus broadly, uniformly convex with truncate produced median part of anterior margin wider than $\frac{1}{3}$ maximum clypeal width; clypeus not at all obscured by sparse, short vestiture; supraclypeal area yellow except for small dark spot below each scrobe; scape, pedicel and first flagellar segment bicolorous, yellow beneath, dark above; flagellum with segment 2 subcylindrical but with subsequent segments becoming progressively flattened beneath; terminal flagellar segment abruptly recurved forming a lamelliform hook; mandible bidentate with both minute denticles terminal. Fore legs yellow except for dark spot on femora above and on coxae above and with all vestiture pale; mid legs yellow except for dark spot on inner side of tibiae and dark spot on coxae above; mid coxa with prominent yellow ventrally projecting lobe; mid basitarsus with hollow channel along entire outer edge; hind legs yellow but with dark patches on coxa above, on femur above, on inner apex of tibia, on outer side of tibia and outer apex of basitarsus; hind coxae produced ventrally into a strongly arched transverse ridge; hind trochanter greatly produced posteriorly and longitudinally ridged along inner edge; hind femur grossly inflated with a short longitudinal carina along inner edge approaching apex; hind tibiae less strongly inflated, strongly convex in front, nearly flat behind

and with outer edge longitudinally ridged but not carinate; hind tibia with inner edge angulate in outline near midpoint; hind basitarsi conspicuously excised on inner side; hind tarsi with golden vestiture on inner side. Metasomal tergum 1 with lateral arms of gradulus present, median transverse section absent; metasoma with yellow transverse band narrowly interrupted medially on tergum 1, entire on all other terga; tergum 4 and 5 with small, oval uniformly finely aciculate spot mesad of each spiracle and anterior but nearly tangent to gradulus.

Distribution: This species has been recorded from three locations in South West Africa, Damara Land (Type locality—Cockerell, 1909, p. 413), Grotfontein (Friese, 1909, p. 170) and Otjiverongo (sic) (Friese, 1930 p. 14) and one locality in Southern Rhodesia, Beit Bridge (Cockerell, 1933, p. 376). Although the records are too few to permit an accurate estimate of its distribution, the presence of populations on opposite sides of the southern part of the African continent and more than 700 miles removed from each other suggest it may be extensive. The species is apparently a summer flying species since the only specimens with collection dates were taken in February (Otjiverongo) and April (Beit Bridge).

I have examined a pair of specimens from Beit Bridge (labeled in Cockerell's handwriting as *M. binghami*) and a single female from Grotfontein (labeled in Friese's handwriting as *Nomia flavofasciata*). Though the females differ in several minor details such as extent of yellow markings, density and color of vestiture, they are so similar otherwise that I concur with Hedicke (1931) that they are conspecific.

***Meganomia tavetensis* Cockerell**

(Fig. 1, 3, 6, 11)

Meganomia tavetensis Cockerell, 1934, pp. 444-445 (Female described).

Female: Length 15 mm. Vertex convex in frontal view; compound eyes not conspicuously large, inner orbits diverging along lower $\frac{1}{3}$, gently, weakly emarginate along upper $\frac{1}{3}$; summit of eyes not approaching top of vertex in frontal view; lateral ocelli removed by more than one diameter distance from top of vertex in frontal view; clypeus with pronounced median longitudinal ridge, otherwise flat; vestiture of clypeus obscure, composed of very short, sparse erect golden hairs; supraclypeal area yellow across entire lower end; scape unicolorous, dark; mandibles (worn) apparently lacking subapical tooth; maxillary palpi with length less than half that of post palpal portion of galea; longest setae on apical lobe of galea less than one third width of that lobe; labial palpi with first segment flattened slightly and with one edge medially, weakly angulate in outline. Notauli obscure; parapsidal lines short, not reaching hind margin of mesoscutum; marginal cell apically appendiculate; 2nd submarginal cell shorter than 3rd along posterior edge; sides of 2nd submarginal subparallel or only very slightly converging anteriorly; hind femora lacking ventral longitudinal carinae; basitibial plate, if present, totally obscured under dense velvet-like pubescent patch; scopa sparse, composed of short dark hairs; hind tibial spurs conspicuous, extending beyond

adjacent hairs. Metasomal tergum 1 lacking gradulus laterally as well as medially; terga 4 and 5 lacking small, aciculate spots mesad of spiracles and anterior to gradulus; sterna with long, oblique, dense, dark vestiture suggestive of scopa in some megachilids.

Male: Unknown.

Distribution: This species is only known from the southern part of Kenya where the type series, two females, was collected at Taveta on the Lumi River in December of 1912.

I have examined one of these two specimens. In addition to an identification label in Cockerell's handwriting and the appropriate collection data label, it has a red U.S.N.M. paratype label bearing the number 58073.

***Meganomia tsavoensis* (Strand)**

Nomia tsavoensis Strand, 1920, p. 93-94 (Female described); Cockerell, 1931, p. 201 (Transfer to *Meganomia*).

Meganomia tsavoensis: Cockerell, 1931, pp. 201-202 (Transfer from *Nomia*; redescription of female); Cockerell, 1934, pp. 444-445 (Compared with *M. tavetensis*).

Female: The female of this species is very similar to that of *M. tavetensis* and may prove to be synonymous with it. Cockerell (1934) found only one structural character by which they differed: *M. tsavoensis* apparently lacks the median longitudinal ridge found on the clypeus of *M. tavetensis*. All other contrasting characters described by him are minor color differences which could easily represent intraspecific variation.

Male: Unknown.

Distribution: This species is only known from a single female collected in April of 1913 in the southern part of Kenya. The locality published by Strand, Tsavo River, could be near Taveta since the eastern end of that river approaches within about 25 miles of that town, the type locality of the preceding species.

***Meganomia andersoni* (Meade-Waldo)**

Nomia (Meganomia) andersoni Meade-Waldo, 1916, p. 457-458 (Male described).

Meganomia andersoni: Cockerell, 1931, p. 201 (Cited in *Meganomia*).

Female: Unknown.

Male: Length 18 mm. Judging from Meade-Waldo's description and comments the male of this species differs from that of *M. binghami* in at least the following characters; clypeus with truncately produced part of anterior margin much narrower than $\frac{1}{3}$ maximum clypeal width; flagellar segments 4 to 10 subtuberculate beneath making flagellum serrate; terminal flagellar hook formed from 3 last segments instead of one. Fore legs with coxae, trochanters and femora mostly black with tibiae and tarsi yellow; fore tarsi with conspicuous fringe of black hairs on inner side; mid legs yellow; hind legs with tarsi almost entirely black and with black pubescence on inner side; hind trochanter not pointed behind. Metasomal

terga 1-7 black, with yellow bands widely interrupted in middle and widening abruptly towards sides.

Distribution: *M. andersoni* is only known from its type locality, Masai Reserve in the southern part of Kenya, where a single male was collected on April 14, 1913.

Although being clearly distinct from *M. binghami* this species could easily represent the unknown male of either *M. tsavoensis* or *M. tave-tensis* which have been collected at the same season of the year in the same general part of eastern Africa.

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